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FISTULA IN ANO IN PHTHISIS,

—AND—

ACTINOMYCOSIS BOVIS.

—BY—

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## FISTULA IN ANO IN PHTHISIS.

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### I.

Anal fistulæ are common in phthisical patients, and it was formerly thought that they exercised some protecting influence against this disease. The belief was common among practitioners that a patient with suppurating rectal fistulæ, was, if not altogether prevented from acquiring the disease at any rate when suffering from phthisis, was enabled to resist the advance of the disease as long as the fistula remained open. Experience has, however, taught us that getting rid of a suppurating cavity is decidedly beneficial to the patient.

I wish to point out what seems to me to be a possible cause of fistula occurring in cases of phthisis.

It is not generally known that a sinus exist in the normal contracted state between the external and internal sphinctures of the anus. The accompanying illustration is taken from the photograph of a section made vertically through the anus of a boy of 17 who died from acute poisoning. The existence of the sinus has been verified in other cases. The whole anus together with a small portion of the skin on the outside and mucous membrane on the inside, was removed in a circle and, after hardening, sections were made through various parts of this ring of material so as to include the parts external and internal to the sphincters.

The photograph is twenty-four times the natural size and shows the relations of the parts.

Beginning from without and following the epidermis it will be seen that directly after it has passed the superficial part of the external sphincter, it dips down and forms a sinus.

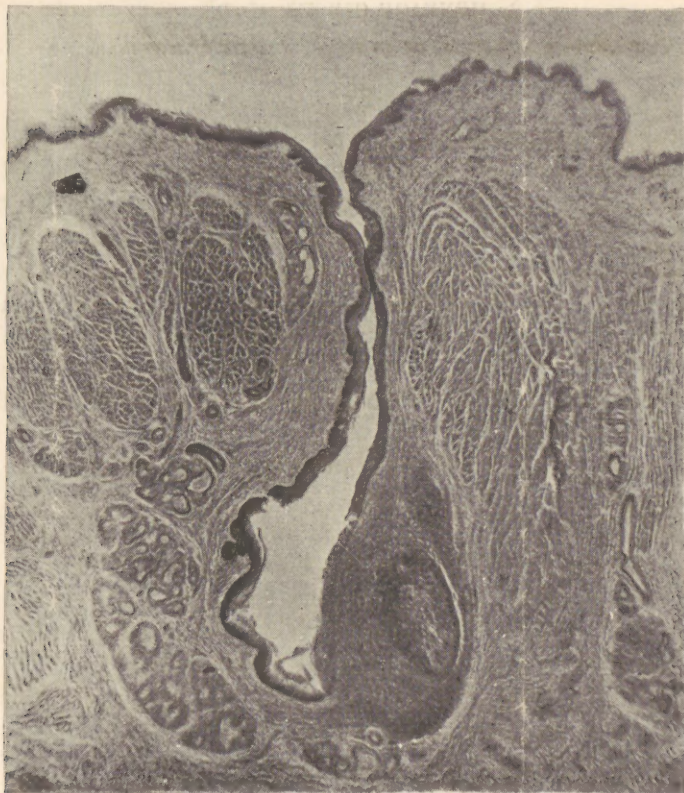
This sinus is about one-eighth of an inch in depth, it widens out at the bottom, and in the anterior wall there is a lymph follicle, which is in close contact with the epidermis.

Directly under the epithelium of the anterior wall and in the angle formed by the epidermis as it passes in towards the mucous membrane of the rectum, is the internal sphincter.



The structure of the parts then is this, between the external and striped muscle and the internal non-striped muscle sphincters there is a deep sinus having at the bottom in the anterior well a mass of lymphoid tissue.

This resembles an ordinary solitary gland, the central portion is composed of dense adenoid tissue and is partially separated from the surrounding diffuse adenoid tissue by a lymph sinus, the walls of this sinus being formed of a fenestrated nucleated membrane. It resembles a tonsil in structure and arrangement.



It is now a well-known fact from experimental investigation that the tissues first affected after inoculation with phthisical material are those of the disseminated lymphoid follicles in the lungs, spleen and other parts; it is therefore perfectly justifiable to conclude that in a case of general tuberculosis this lymph follicle at the bottom of this sinus may become the seat of tubercular change followed by breaking down and subsequent ulceration. This ulcerative process would have to extend only a short distance internally to involve a so-called sweat gland, the duct of which passes upwards through the anterior fibres of the internal



sphincter; and there opens on the surface. In this way there is direct communication with the mucous membrane about half an inch or less inside the external sphincter. It must be remembered, however, that on the introduction of the finger or a speculum the sinus before mentioned would be spread out and obliterated, and this will account for the statement made by many surgeons, that the internal opening is found much higher up. The same fact will account for the statement that the internal sphincter embraces the lower one and one-half inches of the rectum, as a matter of fact which can be verified by an examination of a section through the parts, Quain's description is perfectly correct, namely, that the internal sphincter embraces about the lower half inch of the rectum.

Some cases of fistula *in ano* are described in which the external opening exists outside the external sphincter. These cases may be accounted for by the ulceration extending outward until it reaches the body of some of the numerous glands which lie outside the external sphincter, with their duct leading directly to the surface.

In this way a fistula may be formed, with its internal opening within an inch inside the anus, and having the external opening either at the bottom of the sinus, or, if the ulceration has extended further, it may be outside the external sphincter.

So far as I know, these facts have never been mentioned before in any works on surgery or anatomy, and may prove of interest.

## II.

### ACTINOMYCOSIS BOVIS.

I have lately made some observations on a case of actinomycosis in the tongue of a cow, more especially with a view to determining the growth and arrangement of the mycelium. The published accounts vary very much in their descriptions, and some observers seem to have failed to find the mycelium at all. On reading the different accounts and comparing the illustrations given, I find that either the ray itself must vary very much in size in different cases, or the measurements given are incorrect; also the manner in which it stains must vary according to whether it is in a fresh or hardened condition.

In sections of the hardened organ I find it very difficult to stain the ray itself, and altogether impossible to stain the mycelium. This may of course be the result of the hardening method. I find the rays in this case, as well as in some others I examined formerly, to be much smaller than generally represented, and to be rather infrequent in their occurrence.

On the other hand, I find the mycelium permeating all the connective tissue under the superficial epithelium of the tongue, and in some parts even penetrating it. Wherever the mycelium abounds, there the sec-

tion has a pale yellow appearance, except in those parts where it has set up an inflammatory action. Here there is typical inflammatory infiltration, and the leucocytes stain deeply. In only some of the inflammatory foci can rays be found, but this may be from the sections containing only a peripheral portion of an inflammatory nodule produced by the presence of a ray. It seems to me that the mycelium does not set up much irritation, but that the rays invariably do, and in many sections I have found the inflammatory action has gone on until disintegration is produced, and a minute abscess formed. The growth is not confined to the subepithelial tissue, but in places has penetrated



Portion of the Tongue of a Cow X 130.  
Longitudinal Section.

into the epithelium and caused inflammatory action and breaking down there.

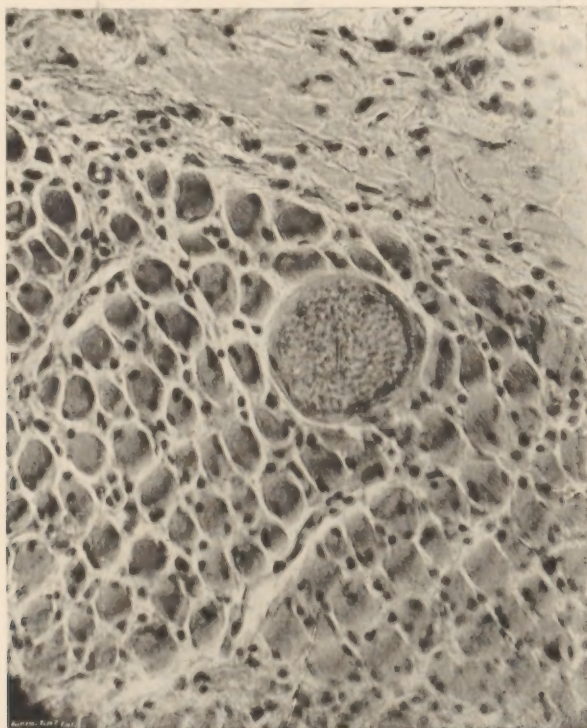
I have also noticed a peculiar feature in the growth of this fungus, that is, the manner in which it penetrates a muscle fibre and increases in its interior.

The two accompanying photographs of this condition will fully



explain it. They were taken with one of R. & J. Beck's  $\frac{4}{10}$  in. magnification 130 diameters. In the one a muscle fibre is cut longitudinally, and has the mycelium occupying its centre; the other shows a fibre cut transversely. The appearances presented by these fibres are exactly similar to what have been described as Rainey's or Miescher's corpuscles.

Ziegler, Vol. I., page 346 (English edition), says: "Our knowledge of the organisms known as 'Miescher's corpuscles' or 'Rainey's corpuscles' is still very defective. They are cylindrical or tube-like bodies, found not infrequently in the muscles of the pig, ox, sheep and mouse. They contain an innumerable multitude of small oval and reniform corpuscles."



Portion of the Tongue of a Cow X 130.

Transverse Section.

Claus, Text-book of Zoology, Protozoa, page 208, gives an illustration which is, I think, exactly similar to that I have described. He says, in describing the illustration: "Rainey's corpuscle from the flesh of a pig: (a) an animal inside a muscular fibre." He describes spores in a part more highly magnified. The appearance presented by sections of these muscle fibres are those that would be shown, when examined with

a high power, if a fibre contained in its centre some substance of a much higher refractive index than that of the muscle itself, and careful illumination leaves little doubt that these appearances are produced by the growth of mycelium in the fibre.

After making a series of experiments with different re-agents I have been able to show that portions of the rays are contained in the muscle fibres and they are plainly made out with a high power as they stain quite differently to the mycelium.